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ERTS PROGRESS REPORT

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FOR THE PERIOD 1 OCTOBER 1973 TO 30 NOVEMBER 1973

PLANNING APPLICATIONS IN EAST CENTRAL FLORIDA

PROPOSAL NO. Y-10-066-001

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BREVARD COUNTY PLANNING DEPARTMENT

TITUSVILLE, FLORIDA

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PLANNING APPLICATIONS IN EAST CENTRAL FLORIDA

PROPOSAL NO. Y-10-066-001

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Residential Characteristics

It has been found that, in some cases, computer mapping of the ratio of two ERTS MSS bands can distinguish between older residential areas with appreciable numbers of good-sized, deciduous trees and newer residential areas with fewer trees. This point is illustrated in Figure 1, which is a map of the ratio of band 7 radiance to band 5 radiance. Region 1 is an older section with more and larger deciduous trees than the newer sector 2. Sector 3 also is newer and has fewer trees. This characteristic for these sectors can be seen also in a photograph, Figure 2.

Change Monitoring

MSS digital tapes have been received for an essentially cloud-free pass for this region. An attempt has been started to evaluate the digital data for use in monitoring urban change by comparing density-sliced and band ratio maps made from the two sets of data.

The two dates are September 6, 1972 and April 28, 1973, giving an interval of approximately eight months.

Due apparently primarily to differences in atmospheric conditions, the radiance values were significantly higher for the second pass. The method used to normalize the data was to make the choice of character levels for mapping the second set of data such that certain commercial regions which were known to have remained relatively constant during the period appeared the same (same characters and same area) on the second map as on the first.

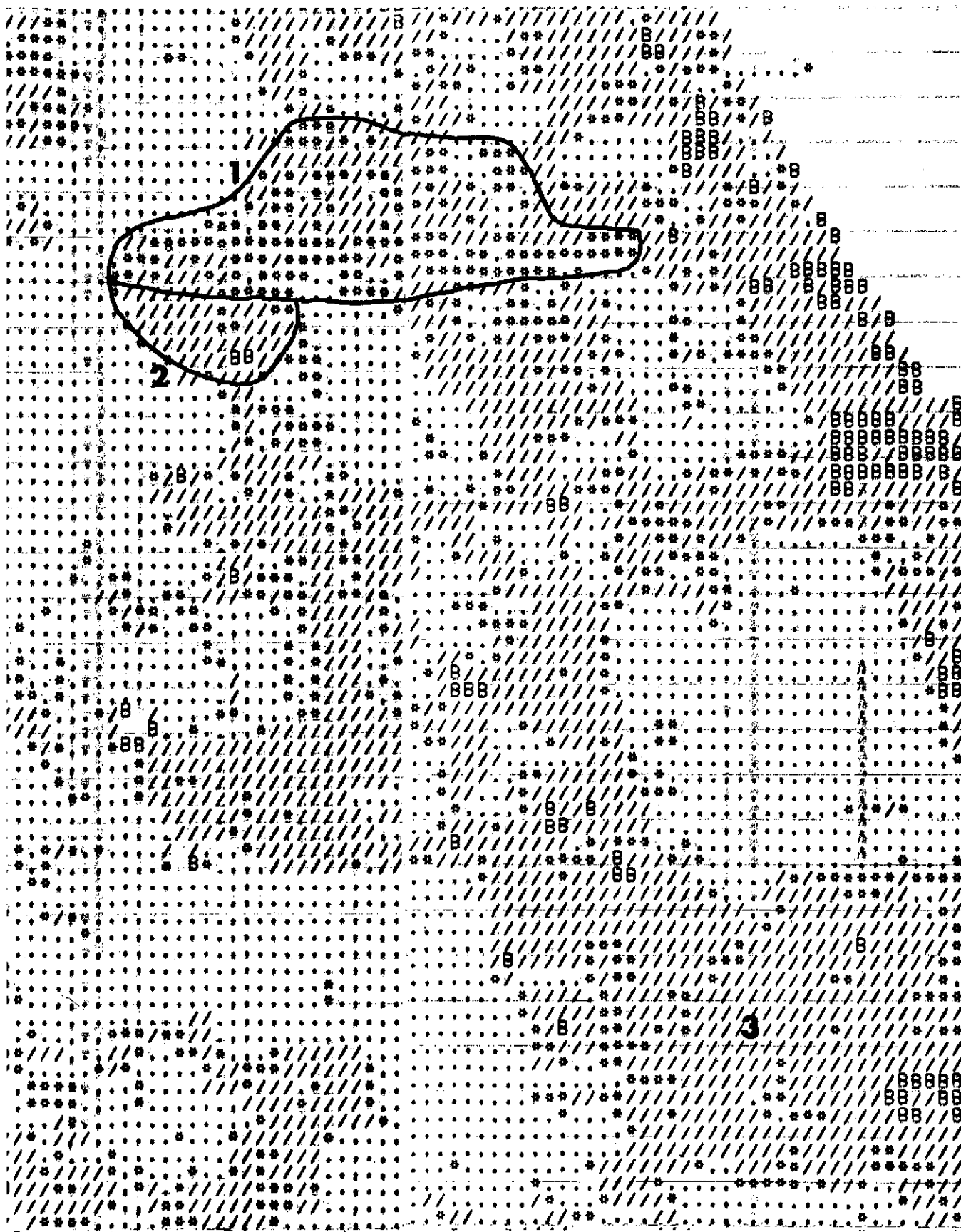


FIGURE 1



FIGURE 2
-3-



FIGURE 2 (con't)
-3a-

Due to differences in locations of the viewed resolution elements on the different passes, at least, there will be minor differences in the computer maps even where there have been no changes in the scene, so that a change of one character, for example, on the map often is not significant; but, as a rule of thumb, a change of two or more characters usually is significant and should be checked.

Because Titusville is the area which has been most thoroughly studied by us, it was used as the sector for the first attempt at change monitoring. Two types of map were used in making the comparison: band 5 density and the ratio of bands 7/5.

The results described below use the combined information available from the two types of maps; some of the changes were observable on one of the map types, some on the other, and some on both.

Certain obvious changes are readily observable (For reference purposes, we shall refer to them as Class A changes):

- (1) construction of a new motel
- (2) grading associated with construction of a new high school
- (3) grading at an industrial park
- (4) construction of 3 single-family houses adjacent to each other
- (5) construction of two single-family houses adjacent to each other
- (6) construction of a new single-family house
- (7) street construction
- (8) sand quarry in initial stage of development.

Most of these changes caused a change in several map characters (resolution elements).

A check with the City Building Department indicated several other construction projects which had some activity during the period under consideration. These locations were checked against the computer maps with the following results (call these Class B changes):

- (9) enlargement of parking lot -- in central business district -- not distinguishable on ERTS maps
- (10) construction of church -- small -- one lot -- believed seen on ERTS map
- (11) construction of addition to school -- seen on ERTS maps but not noticed as Class A because it is adjacent to a shopping center
- (12) 8 new single-family houses in a single subdivision -- scattered -- not observed on ERTS maps
- (13) condominium additions -- observable on ERTS maps
- (14) condominium construction -- observable on ERTS maps
- (15) 5 single-family residences in the same general area -- observable on ERTS maps
- (16) 9 single-family houses in same addition but mostly scattered -- not observed on ERTS maps
- (17) 3 single-family homes adjacent to each other -- not observed on ERTS maps
- (18) construction of small commercial building -- not observed on ERTS maps
- (19) 6 single-family homes in same general area -- observable on ERTS maps
- (20) construction of a small commercial building -- possibly observable on ERTS maps but indistinguishable from (7)
- (21) construction of 4-unit condominium -- observable on ERTS map
- (22) addition to condominium -- not observable on ERTS maps

- (23) construction of small commercial building -- observed on ERTS maps
- (24) construction of an additional building in an industrial complex located on bare sand -- not observed on ERTS, as the complex and surrounding sandy area already showed a maximum level of radiance.

It will be noted that of the sixteen Class B changes, nine were observable on the ERTS maps. With more careful analysis, they could, then, have been detected from the ERTS maps, followed by ground checking; however, such a procedure would involve checking out a comparable number of "false leads." The remaining six Class B changes could not be detected by the ERTS analysis techniques used by us to date.

A preliminary observation at this point is that major changes can be detected almost automatically but the monitoring of minor changes by density-sliced mapping and band ratio mapping is not yet an automatic process. Results to date indicate that, when supplemented by appropriate ground checking, it can be a useful tool. At least, further experimentation and development of techniques is justified. More careful character-by-character comparison of corresponding maps might improve the accuracy. Maximum likelihood classification techniques, which we intend to apply at a future date, may result in increased effectiveness.

Figure 3 shows the locations of the changes observed on the ERTS maps as described above.

Presentation

A discussion of work done to date on this project was given by Dr. Thomas at a Regional Sciences and Applications Symposium held at Kennedy Space Center, October 29 and 30.

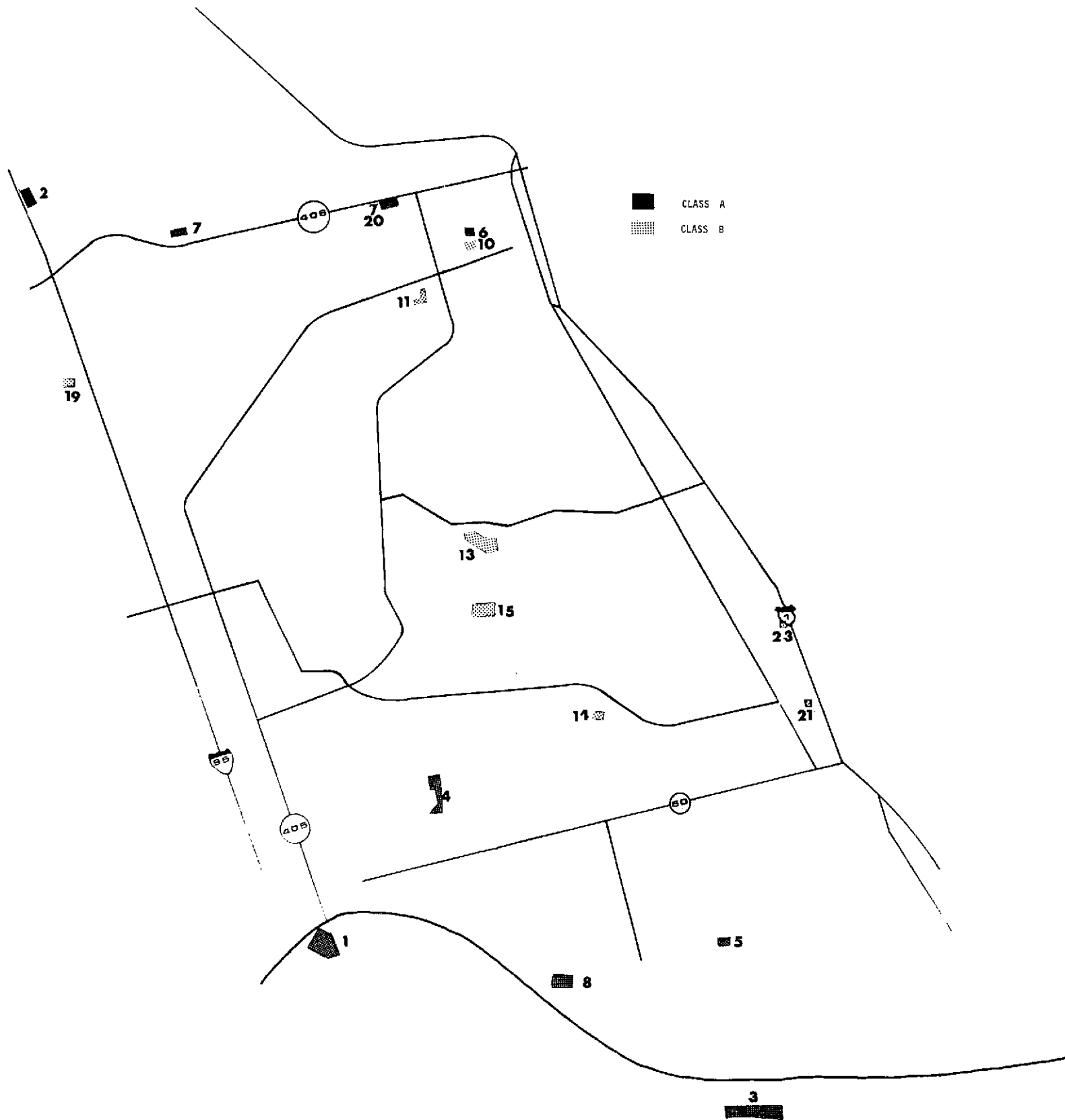


FIGURE 3
-7-